National Institute of Environmental Health Sciences

Climatic suitability of aedes albopictus in europe referring to climate change projections: Comparison of mechanistic and correlative niche modelling approaches

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Year: 2014
Journal: Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin). 19 (6): 20696

Abstract:

The Asian tiger mosquito, Aedes albopictus, is capable of transmitting a broad range of viruses to humans. Since its introduction at the end of the 20th century, it has become well established in large parts of southern Europe. As future expansion as a result of climate change can be expected, determining the current and projected future climatic suitability of this invasive mosquito in Europe is of interest. Several studies have tried to detect the potential habitats for this species, but differing data sources and modelling approaches must be considered when interpreting the findings. Here, various modelling methodologies are compared with special emphasis on model set-up and study design. Basic approaches and model algorithms for the projection of spatio-temporal trends within the 21st century differ substantially. Applied methods range from mechanistic models (e.g. overlay of climatic constraints based on geographic information systems or rather process-based approaches) to correlative niche models. We conclude that spatial characteristics such as introduction gateways and dispersal pathways need to be considered. Laboratory experiments addressing the climatic constraints of the mosquito are required for improved modelling results. However, the main source of uncertainty remains the insufficient knowledge about the specieś ability to adapt to novel environments.

Source: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20696

Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A1, SRES A2, SRES B1

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Meteorological Factors, Precipitation, Solar Radiation, Temperature

Temperature: Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

General Geographical Feature

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Region

Other European Region: Southern Europe

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Chikungunya, Dengue, General Mosquito-borne Disease

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Methodology, Other Projection Model/Methodology

Other Projection Model/Methodology: Mosquito habitat

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Medium-Term (10-50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content